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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/996,233	11/28/2001	Victor Vilnrotter	47456/RAG/C766	9956

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EXAMINER	
LEE, DAVID J	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/996,233	VILNROTTER ET AL.	
	Examiner	Art Unit	
	David Lee	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11/28/2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some* c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/15/2002*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "receiver circuit", the "selector circuit", and the "combiner circuit" of claim 1 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. Claim 1 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 1, the "receiver circuit", the "combiner circuit", and the "selector circuit" are not mentioned in the specification and there is no explanation as to how they correspond with each other in both structure and function, and therefore disables one skilled in the art to make or use the invention.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 18-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Bruckler et al. (US Patent No. 4,490,039).

Regarding claim 18, Bruckler teaches detecting an incoming optical signal with a plurality of detector elements (col. 2, line 28) such that each detector element outputs a detector output (col. 2, lines 29-37); and optimizing the detector outputs utilizing an optimally weighting signal processing means (col. 2, lines 39-42: only signals above a

certain threshold are weighted, and the signals with an output of less than a certain threshold have no weight and are ignored).

Regarding claim 19, Bruckler teaches detecting an incoming optical signal with a plurality of detector elements such that each detector element outputs a detector output; and optimizing the detector outputs utilizing an adaptive synthesized single-detector signal processing means (col. 2, lines 41-42: by ignoring those signals with an output of less than a certain threshold, an effective signal mask is created of only those signals above the threshold, and therefore, these above-threshold signals are effectively grouped to form a synthesized single-detector).

Regarding claim 20, Bruckler teaches detecting an incoming optical signal with a plurality of detector elements such that each detector element outputs a detector output (col. 2, line 28); and optimizing the detector outputs utilizing signal-to-noise processing means (col. 2, lines 41-63, and col. 4, lines 6-9).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-9, 12-14, and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonsalves et al. (US Patent No. 4,309,602) in view of Holtzman et al. (US Patent No. 6,404,760).

Regarding claims 1 and 12, Gonsalves teaches an optical receiver (fig. 1) for receiving and processing turbulence degraded optical signals comprising: a detector array (fig. 1, 13) comprising a plurality of detector elements (col. 3, lines 36-39) for detecting a point spread function characteristic of the received optical signal (col. 4, lines 7-9), wherein each of the plurality of detector elements outputs a detector output characteristic of a portion of the point spread function (col. 3, lines 49-51, and col. 4, lines 7-9, and col. 4, lines 24-33); Gonsalves does not disclose a signal processor for real-time processing the detector outputs to optimize the performance of the receiver by separating a plurality of performance enhancing detected signals from a plurality of performance degrading detected signals or a decoder for detecting the received optical signal in the processed signal and outputting a decoded optically transmitted symbol to a user.

However, Holtzman discloses a signal processor (fig. 4) to optimize the performance of the receiver by separating a plurality of performance enhancing signals from a plurality of performance degrading signals (fig. 5, 504: the signals are ranked in order of decreasing performance level and thus the enhancing and degrading signals are effectively separated), the signal processor further comprising: a receiver circuit for receiving outputs and estimating a signal intensity from each output (fig. 4, 410: the estimator 410 receives signals and estimates signal intensity), a selector circuit for

selecting the performance enhancing outputs by selecting the outputs containing sufficient signal intensity to improve performance (fig. 4, 412, and col. 7, lines 56-60), and a combiner circuit for combining the performance enhancing outputs into a single processed signal (fig. 4, 414 and col. 7, lines 61-66: the combiner multiplies the strongest signal); and a decoder for detecting the received optical signal in the processed signal and outputting a decoded optically transmitted symbol to a user (col. 7, lines 7-10).

One of ordinary skill in the art at the time of invention would have been motivated to use the signal processor as indicated by Holtzman in the receiver of Gonsalves because estimating signal intensities and combining the strong signals together provides a more accurate and strong output signal. Therefore, it would have been obvious to an artisan at the time of invention to incorporate the signal processor of Holtzman in the receiver of Gonsalves to receive and process a plurality of detected signals, choose the strong signals, and combine them together to form a strong output signal.

Regarding claim 2, Gonsalves discloses a collecting aperture for collecting the transmitted signals from an external source (fig. 1, 11, and col. 3, line 46: the aperture is part of the adaptive optics).

Regarding claim 3, Gonsalves discloses focussing optics for focussing the received signals onto the detector (fig. 1, 11, and col. 3, lines 18-20).

Regarding claims 4 and 5, Gonsalves discloses the detector comprises a grid array of N.times.M detector elements (fig. 1, 13: it can be seen that the detector array grid is larger than 4x4).

Regarding claim 6, Gonsalves discloses that the detector elements are selected from the group consisting of: photomulipliers, avalanche photodiodes and PIN diodes (col. 3, lines 36-39).

Regarding claim 7, Gonsalves discloses that the signal processor operates on the received optical signal at a rate equal to or greater than the Nyquist rate (col. 6, lines 31-34: the Nyquist rate is $\lambda F\#/2$, and it is inherent that the signal processor must operate at a rate equal or greater than this rate in order to process and produce feedback).

Regarding claim 8, the combined invention of Gonsalves and Holtzman teach that the signal processor processes the received optical signal by weighting the detector outputs based on a function of a characteristic signal to noise ratio wherein the function is either a logarithmic function or an approximation of a logarithmic function (col. 2, line 37 and col. 2, lines 52-55: the strongest signal is considered to have the highest signal to noise ratio, since Holtzman discloses in col. 2, line 37 that all other signals are considered to be noise. Algorithms, which are computational procedures that can consist of logarithms, are used to choose the strongest signal, with the most weight).

Regarding claim 9, the combined system of Gonsalves and Holtzman teach that the signal processor processes the received optical signal by ranking the detector

outputs and utilizing only those detector outputs with the greatest signal content (col. 8, lines 52-61).

Regarding claim 13, the combined system of Gonsalves and Holtzman teach calculating weighted log-likelihood functions for each detector output and comparing the weighted log-likelihood functions for each detector output to determine the greatest log-likelihood function (col. 7, lines 42-47, and col. 2, lines 52-54).

Regarding claim 14, the combined system of Gonsalves and Holtzman teach ranking the detector outputs based on their signal intensity (fig. 5, 504), and computing the probability error for each successive set of detector elements (col. 3, lines 13-15) plus a measured background noise for each of the detector elements (col. 2, line 37: the other user signals are considered to be noise and can be measured with conventional CMDA receivers).

Regarding claim 16, the combined system of Gonsalves and Holtzman teach ranking the detector outputs based on their signal intensity (col. 8, lines 52-53), and wherein the step of comparing comprises assigning a weighting value to each of the detector outputs according to an approximation of a logarithmic rate for each of the detector outputs (col. 8, lines 62-63).

Regarding claim 17, the combined system of Gonsalves and Holtzman teach calculating a signal-to-noise ratio measure (col. 2, line 37: the strongest signal is considered to have the highest signal to noise ratio, since Holtzman discloses in col. 2, line 37 that all other signals are considered to be noise) for each detector output and assigning a weighting value to the outputs based on those ratios (col. 8, lines 62-64).

7. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gonsalves in view of Holtzman as applied to claim 1 above, and further in view of O'Callaghan et al. (US Patent No. 5,552,916).

The combined system of Gonsalves and Holtzman as applied to claim 1 above teach all the limitations of claim 10 except for the limitation that the received optical signal is transmitted in an intensity modulated transmission protocol. O'Callaghan teaches intensity modulating an optical signal using an intensity modulator (fig. 15b, and col. 16, lines 12-22). One of ordinary skill in the art would have been motivated to transmit an optical signal in an intensity modulated transmission protocol as indicated by O'Callaghan because the transmittance characteristics of intensity modulation do not depend on the light's wavelength (col. 16, line 65), therefore it would have been obvious to an artisan at the time of invention to intensity modulate a received signal as indicated by O'Callaghan in the combined system of Holtzman and Gonsalves.

8. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gonsalves in view of Holtzman as applied to claim 1 above, and further in view of Janusas (US Patent No. 5,640,419).

The combined system of Gonsalves and Holtzman as applied to claim 1 above teach all the limitations of claim 10 except for the limitation that the received optical signal is transmitted in a protocol selected from the group consisting of: binary pulse-position modulation, M-ary pulse-position modulation and on-off key modulation.

Janusas teaches transmitting an optical signal using binary pulse-position modulation, or pulse code modulation (col. 1, lines 23-31). One of ordinary skill in the art would have been motivated to transmit the optical signal using binary pulse-position modulation as indicated by Janusas because since all pulse modulations are binary, it is able to deliver a high quality signal even when noise and interference are bad. In addition, pulse position modulation have the advantages that the hardware and/or software required to send and receive transmissions is generally simple, and the transmissions are relatively easy to detect (col. 1, lines 34-45). Therefore, it would have been obvious to pulse-position modulate the optical signal as indicated by Janusas in the combined system of Gonsalves and Holtzman.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gonsalves in view of Holtzman as applied to claim 12 above, and further in view of Bruckler et al.

The combined system of Gonsalves and Holtzman as applied to claim 12 above teach all the limitations of claim 15 except for the limitation that the step of comparing comprises assigning a weighting value of 1 to those detector outputs above a specified threshold of received optical signal and assigning a weighting value of 0 to those outputs below the specified threshold to create an effective signal mask. Gonsalves and Holtzman teach ranking the detector outputs based on their signal intensity (fig. 5, 504 of Gonsalves). Bruckler teaches the step of comparing comprises assigning a weighting value of 1 to those detector outputs above a specified threshold of received

optical signal and assigning a weighting value of 0 to those outputs below the specified threshold to create an effective signal mask (col. 2, lines 39-42: by ignoring or assigning "0" to those signals with an output of less than a certain threshold, and accept those signals above a certain threshold, or assigning "1", an effective signal mask is created of only those signals above the threshold). One of ordinary skill in the art at the time of invention would have been motivated to create an effective signal mask as indicated by Bruckler in order to have a stronger output signal and ignoring those signals under threshold ("0"). Therefore, it would have been obvious to an artisan at the time of invention to create an effective signal mask of the signals as indicated by Bruckler in the system of Gonsalves and Holtzman.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David Lee whose telephone number is (571) 272-2220. The examiner can normally be reached on Monday - Friday, 9:00 am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600

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David Lee